Personality and behavioural change after severe blunt head injury—a relative's view

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SUMMARY A close relative of 55 severely head injured adults rated the personality of the patient at 3, 6 and 12 months after injury, using a Yes/No judgement, and analogue scales comprising bipolar adjectives. The relative assessed the "current" as well as the "premorbid" personality at each time. Personality change was associated with many negative scores on the analogue scale, and increasing negative scores were associated with high "subjective burden" on the relative. Severity of injury (post-traumatic amnesia) was of no significance in predicting the extent or pattern of personality change.

Severe head injury causes brain damage leading to physical, cognitive and behavioural changes in the injured patient. The physical effects ranging from sensori-motor disturbance to post-traumatic epilepsy are well known,¹ as are the cognitive sequelae.² However, the emotional and behavioural changes, and in particular the changes in personality are less well understood and less intensively researched,³ although experienced clinicians have been well aware of their existence. Both London⁴ and Thomsen⁵ commented on the burden placed upon families who may have to cope with behaviourally and personality disturbed survivors of severe head injury. Similarly Hpay,⁶ Lezak,⁷ Rosenbaum and Najenson,⁸ and Oddy, Humphrey and Uttley,^{9,10} have all noted the frequency with which personality change may follow severe injury.

Despite these reports, there have been few, if any, empirical studies designed specifically to identify the nature, and to follow the evolution of, personality change during the first year after severe head injury. One reason for this paucity of studies may be the conceptual and methodological problems faced by workers in this area. Even the selection of an appropriate measuring instrument is a major problem here, as there are many personality theories which generate a great variety of measures, but these often seem singularly inappropriate when

judged against the clinical realities of the head injury population. For example, many patients may show a lack of insight, or may be unwilling to admit to changes in personality, or may underestimate the significance or the consequences of such changes.

For reasons such as these, we decided firstly not to tie ourselves to one specific personality theory, and secondly, to assess personality change as judged by a close relative of the patient, rather than the patient himself. The relative, we felt, is much less likely than the patient to show a serious lack of insight concerning personality change, and should therefore be in a better position than the patient to judge both the type and degree of change. The method that we have chosen has been to use bipolar adjectives (fig 1), to form analogue scales.

The study aimed to answer three questions as follows: (1) When a relative describes a patient as having shown "personality change", what features of personality or behaviour is she describing, and do these features change over the first year after injury? (2) Does severity of injury influence the extent or type of personality change during the first year after injury? (3) What features of the personality change are associated most strongly with stress or burden on the relative of the injured patient?

Method

Patients and Relatives (table 1)

Fifty-five severely head injured patients (46 male) and their relatives were studied. All patients were aged between 16 and 60 (mean age 35.7 years), and had been referred initially to the Regional Neurosurgical Unit of the Institute of Neurological Sciences, Glasgow, for neurosur-

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Fig 1 Retrospective and current assessment at 12 months in cases with personality changes (33 cases).

gical management following head injury. They had all been in post traumatic amnesia (assessed retrospectively by careful clinical questioning) for at least 48 hours (table 1), or in coma (Glasgow Coma Scale score less than 8) for at least 6 hours, although not all patients were assessed on the Coma Scale. As this is a neurosurgical sample, it contains a high proportion of cases with skull fractures and intracranial haematomas (76%), but frank penetrating injuries were not included, neither were cases with known pre-existing neurological disease or damage. Twenty-six injuries were the result of road traffic accidents; four were sustained at work; 11 in assaults, and 14 by other means.

Procedure

A close relative of the patient (defined as the person with the main responsibility for the patient) was interviewed at 3, 6, and 12 months after the patient's injury. On each occasion, the relative was administered a wide ranging questionnaire (see Ref 3 for further details) designed to assess many aspects of psychosocial recovery, including personality and behavioural change. The relative was also asked to fill in the "personality" adjective check-list shown in fig 1. The choice of questions included in the questionnaire and adjectives in the check-list was dictated by an examination of the relevant literature, and by our own clinical experience of the sorts of changes in personality and behaviour which follow severe head injury. During the course of an interview, the interviewer completed the questionnaire with the relative's help, asking only about changes which had been present in the patient since injury.

Table 1 Distribution of post traumatic amnesia (PTA)

Length (days)	No of cases
2- 7	12
8-14	6
15-28	14
Over 28	21
Total	53

NB In two cases, no reliable estimate was obtained.

Table 2 Number of patients judged to be showing personality change at each assessment

Personality change	Time (months)		
	3	6	12
Present	27	33	33
Absent	28	22	22
N	55	55	55

The relative then filled in the personality adjective check-list, firstly, as the patient was *before* his injury, and secondly (without referring to the "before" assessment), as the patient was *now* at the time of interview. This gave three adjective profiles representing the patient's "current" personality as viewed by the relative at 3, 6, and 12 months after injury, and in addition, three retrospective ratings of the pre-trauma personality (as rated by the relative at 3, 6, and 12 months post injury).

Results

(1) WHEN A RELATIVE DESCRIBES A PATIENT AS SHOWING "PERSONALITY CHANGE", WHAT FEATURES OF PERSONALITY OR BEHAVIOUR IS SHE DESCRIBING?

During the structured interview, the relative had been asked to judge whether or not the patient had changed in personality. This was a simple "Yes/No" judgement which relatives found easy to make, and the numbers reporting the presence of personality change at each time after injury are shown in table 2. It may be seen from this table that the number of relatives judging personality change to be present increases slightly over the first year, with half of the relatives reporting change at 3 months, and nearly two-thirds reporting change by 6 and 12 months.

Using the relative's judgement of personality change allowed separation of the patient group at each time into two sub groups (those judged to have changed and those not). The personality features distinguishing these two groups of patients were then examined by comparing the "current" and "retrospective" scores on each adjective within each of the two sub groups of patients, using paired *t* tests. In view of the large number of *t* tests carried out, only differences significant at at least $p = 0.01$ were accepted, and table 3 gives a summary of these

Table 3 Summary of significant ($p \leq 0.01$) differences (paired t tests) between retrospective and current personality assessments in cases with and without personality change

Adjective pair	Time (months)					
	3		6		12	
	No change	Change	No change	Change	No change	Change
Talkative—Quiet	x x					
Even-temper—quick-temper		x x		x x	x x	x x
Relies on others—self reliant		x x		x x		x x
Affectionate—cold						x x
Likes company—dislikes company						x x
Irritable—easy going		x x		x x	x x	x x
Unhappy—happy		x x		x x		x x
Excitable—calm		x x		x x		x x
Energetic—lifeless	x x	x x	x x	x x	x x	x x
Down to earth—out of touch		x x		x x		x x
Rash—cautious						
Listless—enthusiastic		x x		x x	x x	x x
Mature—childish		x x		x x		x x
Sensitive—insensitive						
Cruel—kind				x x		x x
Generous—mean						
Unreasonable—reasonable		x x		x x		x x
Stable—changeable		x x		x x		x x

x x $p \leq 0.01$

significant differences, which are also illustrated by the profiles at 12 months in the two sub groups of patients (figs 1 and 2). Although only the 12 month profiles are illustrated here (lack of space prevents display of the 3 and 6 month pattern), the shape of the profiles within each of the two sub groups was remarkably consistent over time, being clearly established at 3 months, and remaining very similar at 6 and 12 months. Furthermore, in patients whose relatives had judged there to be *no* personality change, retrospective and current profiles were very similar (fig 2), although by 12 months even *these* patients were beginning to be seen by their relatives as somewhat different after injury, being rated as showing increased irritability and temper, and decreased energy and enthusiasm.

The generally close similarity (only four out of 18 significant differences) between retrospective and current evaluation found in the “no change” patients is not found in those who were judged to have undergone a change in personality. In that group, many of the retrospective-current differences were significant even at 3 months after injury (11 significantly different), while at 12 months, only four are *not* significantly different (Talkative-Quiet, Rash-Cautious, Sensitive-Insensitive, Generous-Mean). This suggests that as the first year after injury progresses, the judgement of the presence of personality change made by a relative becomes associated with an increasingly wide variety of features of personality or behaviour in the patient. Furthermore, an examination of the adjectives in which significant retrospective-current differences were found shows that the differences were in the

direction of increasingly negative or unpleasant features of personality following injury. It may be that as Romano suggested,¹¹ relatives deny the reality of some of these negative changes at least for a time, and only slowly come to accept the full extent of changes in the patient, hence the increasing number of features associated with a judgement of changed personality. However, against this it must be argued that even by 3 months, a large number (11) of the 18 adjectives were judged clearly to have shown a negative change, and this number had increased to 14 by 12 months. Items becoming significant at 12 months which had not been significant at 6 months were coldness, disliking company, and cruelty, all of which may take time to become fully apparent to a family. However, precisely the same could be said of items such as unreasonableness, being out of touch, etc, yet these were clearly significant at 3 months. Denial does not therefore seem to be an adequate explanation of the increasing numbers of significant retrospective-current differences as time passes.

A comparison of the pattern of significant retrospective-current differences in the “change”, and “no change” patients shows that by 12 months after injury, all four items which had been found to show significant retrospective-current difference in the “no change” group, also show significant differences in the “change” group. These particular changes (increased temper and irritability, and decreased energy and enthusiasm) are likely to be perceived by relatives whether or not they judge there to be an overall personality change. Indeed, a reduction in energy is rated to be a significant post trauma change in both groups of patients (whether

Fig 2 Retrospective and current assessment at 12 months in cases with no personality change (22 cases).

personality is changed or not) on all assessments, and this is obviously a very pervasive change following head injury.

The relationship between the adjectives and the judgement of personality change made by relatives was then examined further by using *t* tests to compare the "current" adjective score in patients who had and those who had not been judged to have changed in personality. Again only differences significant at at least $p = 0.01$ were accepted, and these are summarised in table 4 and fig 3. The number of significant adjectives at 3 and 6 months on this analysis is close to that found in the analysis of retrospective-current differences in cases with personality change. There are also similarities in the pattern of scores. However, by 12 months only eight of the adjectives were significant on the independent *t* test "current" analysis, compared with 14 in the paired *t* "retrospective-current" analysis. Inspection of the results show that there is a core group of adjectives showing significant differences both on the retrospective-current analysis, and on the presence-absence of personality change analysis. By 12 months, the following adjectives had shown significant effects on both analyses, and at all times (Even-Tempered—Quick-Tempered, Irritable—

Fig 3 Current Personality Profile and presence of personality change at 12 months.

Easy Going, Unhappy—Happy, Excitable—Calm, Mature—Childish, Unreasonable—Reasonable, Stable—Changeable). A number of these adjectives (Even-Tempered—Quick-Tempered, Irritable—Easy-Going, Excitable—Calm, Stable—Changeable) reflect difficulties in controlling emo-

Table 4 Summary of results of *t* tests ($p \leq 0.01$) of current adjective scores in patients with and without personality change

Adjective	Time (months)		
	3	6	12
Talkative—quiet			
Even-temper—quick-temper	xx	xx	xx
Relies on others—self reliant			
Affectionate—cold			
Likes company—dislikes company			xx
Irritable—easy going	xx	xx	xx
Unhappy—happy	xx	xx	xx
Excitable—calm	xx	xx	xx
Energetic—lifeless		xx	
Down to earth—out of touch	xx		
Rash—cautious	xx	xx	
Listless—enthusiastic	xx	xx	
Mature—childish	xx	xx	xx
Sensitive—insensitive		xx	
Cruel—kind			
Generous—mean		xx	
Unreasonable—reasonable	xx	xx	xx
Stable—changeable	xx	xx	xx

xx $p \leq 0.01$

tion and emotional outbursts, whereas one refers to maturity, and one to general happiness. In interpreting the results of the two analyses, it is important to be aware that a strict alpha level of 0.01 was adopted, thereby reducing the agreement between the two analyses. An illustration of this may be gained by considering the 12 month results, on which six items (Relies on Others, Cold, Lifeless, Out of Touch, Listless, and Cruel) reach significance at 0.01 on the retrospective-current analysis, but not on the change—no change analysis of current scores. However, in each case, the mean scores in the second analysis were in the direction that would be expected (greater negative scores in patients showing personality change), and on four adjectives were significantly different at a lower alpha (Relies on Others, 0.02; Cold, 0.05; Enthusiastic, 0.05; Cruel, 0.03). Using a less stringent alpha would therefore bring the pattern of significant effect in the two analyses very much closer, and would suggest that the results of these two different analyses taken together indicate (using a strict alpha) that personality change in the patient may be associated with difficulties in emotional control (Irritability, Quick-Temper, Excitability, Changeable), with Immaturity and with Unhappiness. Given that the relative judges personality change to be present, these negative features of the patient were judged to be prominent. However, even in those cases where the relative does not judge there to be an overall personality change, patients are still seen to have increased difficulty in emotional control, together with a general reduction in energy and enthusiasm.

(2) DOES SEVERITY OF INJURY INFLUENCE THE NATURE OF PERSONALITY CHANGE DURING THE FIRST YEAR AFTER INJURY?

For the purposes of the study, severity of injury was defined in terms of duration of post traumatic amnesia (PTA). PTA had been assessed retrospectively by careful questioning of both patient and relative, and it was defined operationally as the interval between the injury and the regaining of continuous day-to-day memory. Effects of severity were examined by sub-dividing the head injury cases into the following three severity sub-groups:— Group I, PTA 7 days or less (12 cases); Group II, PTA 8–27 days, (21 cases); Group III, PTA 28 days or more (20 cases); and comparing these three sub-groups using one way analyses of variance on each personality adjective. Only differences significant at at least $p = 0.01$ were accepted, and only one of the F ratios reached significance at any time (Affectionate—Cold), at 3 months. Furthermore, inspection of the mean score showed no signs of any consistent pattern of score with increasing severity of injury.

Table 5 Mean PTA (days) in cases with and without personality change

Personality change	Time (months)					
	3		6		12	
	Mean	SD	Mean	SD	Mean	SD
Present	37.8	31.8	37.8	28.7	36.0	29.6
Absent	23.4	20.6	20.3	21.9	22.0	21.4
t	1.94		2.52		1.98	
p	0.06		0.01		0.05	

NB Separate variance estimates used to compute t .

Table 6 Number of relatives in each burden score category

Burden score	Time (months)		
	3	6	12
1–2 "Low"	17	21	20
3–4 "Medium"	25	17	20
5–7 "High"	10	16	12
N	52	54	52

Using this analysis, there was therefore no association between severity of injury and the magnitude of scores on any of the personality adjectives with the first year of injury.

The question was then addressed differently by using t tests to compare the PTA duration in those cases in whom the relative had described personality change as being present, and those in whom it had been described as absent (table 5). At each time of assessment, the mean PTA for the "change" patients was considerably greater than that for the "no change" patients, and this reached significance at the 0.01 level at 6 months, and 0.05 at 12 months, and just failed to reach conventional significance levels at 3 months ($p = 0.06$). There is therefore evidence that as the severity of injury increases, relatives are more likely to report an overall personality change in the injured patient, although severity of injury is not a good predictor of the magnitude of scores on the personality adjectives.

(3) WHAT FEATURES OF THE PERSONALITY PATTERN ARE ASSOCIATED MOST STRONGLY WITH THE STRESS OR BURDEN ON THE RELATIVE OF THE INJURED PATIENT?

The "Subjective Burden" on the relative was assessed by asking relatives to rate the degree of strain that was being experienced as a result of changes in the patient. This was done in the course of the general structured interview, and the changes in the patient dealt with were not confined solely to personality. A seven point analogue scale was used ranging from marker points "I feel no strain", to

"moderate strain", to "I feel severe strain". Scores on this sample scale were then used as a measure of "Subjective Burden" (SB) on the relative (table 6). The relatives were then sub-divided into two SB groups as follows: Low-Medium (1-4); High (5-7) Burden. The relationship between the relative's burden and the patient's personality was then investigated by means of a series of *t* tests comparing the scores on each adjective in the two burden sub-groups. As before, only differences significant at at least $p = 0.01$ were accepted, and these results are summarised in table 7 and fig 4. At 3 months, only one item (Relies on Others—Self Reliant) was significantly different in the two groups, but this difference disappeared thereafter (presumably as the patient recovered physically and became more self reliant). At 6 months, eight of the adjectives showed a significant difference, and at 12 months these eight were still significant, as were an additional four adjectives. The extent of the relationship between relative's burden and the patient's personality seems therefore to increase over time. At 3 months there was little relationship, whereas at 6 months, aspects of personality change reflecting control of temper, social withdrawal, affection, lack of energy, cruelty, meanness, and unreasonableness were all highly significantly higher in the higher burden group. At 12 months, these same features are all still significantly higher in the high burden relatives, and are joined by a further four adjectives reflecting lack of energy, immaturity, insensitivity, and changeability. This increase in the number of significant relationships over time may indicate the increasing extent to which the relative becomes aware of the pervasive nature, and the effects of the changes in the patient. However, against this argument it must be borne in mind that in the earlier comparison of retrospective-current scores, changes in the patient were indicated clearly even at 3 months, on many of the adjectives, yet by that time only one adjective (relies on others) was significantly higher in the high burden relative. Perhaps a better explanation would be that as time goes on, the relative shows decreasing ability to accept or cope with the changes in the patient which may be markedly negative.

Finally, as an alternative way of assessing the relationship between personality change and relative's burden, a series of Chi squared analyses was carried out to assess the association between the frequency of personality change in the patient (using the Yes/No assessment of personality change) and Subjective Burden using only two burden categories (Low, Medium, High). These results which are shown in table 8 support the previous analysis, indicating that the strength of the association between personality change and Subjective Burden increases markedly

Table 7 Summary of significant ($p \leq 0.01$) differences (*t*-tests) between low-medium, and high burden families

Adjective pair	Time (months)		
	3	6	12
Talkative—quiet		xx	xx
Even-temper—quick-temper		xx	xx
Relies on others—self reliant	xx		
Affectionate—cold		xx	xx
Likes company—dislikes company		xx	
Irritable—easy going			xx
Unhappy—happy		xx	xx
Excitable—calm			
Energetic—lifeless		xx	xx
Down to earth—out of touch			
Rash—cautious			
Listless—enthusiastic			xx
Mature—childish			xx
Sensitive—insensitive			xx
Cruel—kind		xx	xx
Generous—mean		xx	xx
Unreasonable—reasonable		xx	xx
Stable—changeable			xx

xx $p \leq 0.01$.

Fig 4 Current Personality Profile and Subjective Burden at 12 months.

during the first year after injury from an insignificant relationship at 3 months, to one significant at $p = 0.01$ at 6 months, and at $p = 0.004$ at 12 months. Indeed, by 12 months, only one of the "High Burden" families had a patient not showing personality change, whereas in the remaining "Medium" and "Low" burden families, half the

Table 8 Association between personality change (using a yes/no judgement) and family burden

Personality change	3 months		6 months		12 months	
	Absent	Present	Absent	Present	Absent	Present
Subjective burden						
Low	12	5	13	8	13	7
Medium	11	14	6	11	7	13
High	4	6	3	13	1	11
	3.52	NS	6.37	p = 0.01	8.20	p = 0.004

patients did, and half did not show personality change.

Discussion

This study examined personality change in severely head injured patients by means of bipolar adjectives filled in by the relative of the patient. An increasing number of relatives described the patient as showing personality change as the first year after injury progressed, but the pattern of change (in terms of retrospective-current differences) was identified by 3 months after injury, and appeared to persist over the subsequent 9 month period. In those patients whom the relatives described as having shown personality change, the changes were in a negative direction, with reduced self reliance, reduced sensitivity, and increased irritability being strikingly evident even at 3 months after injury.

The results here suggest that not all changes in the patient perceived by the relative have the same implications for relatives. At 3 months, 27 relatives judged the patient to have shown personality change, and in these cases, 11 of the adjective pairs showed a significant difference between the current and the retrospective rating, whereas in the 28 cases judged not to have shown personality change, only two retrospective-current comparisons (Energetic—Lifeless; Talkative—Quiet) were significant. At 6 months, 12 differences were significant in the 32 “personality change” patients, and only one in the “unchanged” patients with the 12 months assessment showing 14 significant differences in the 33 “change” patients, and four significant differences in the remaining “no change” patients. In the “no change” patients at each occasion the relatives judged the patient to have shown a significant decrease in energy (found also in patients judged to have shown personality change). At 12 months, the “no change” patients showed in addition a significantly increased “current” score on irritability, quick-tempered, and listlessness—all differences also found in the patients judged to

have shown personality change. These four retrospective-current differences are not therefore in any sense specific to patients judged to have shown personality change. They are found in the head injured patients as a whole, unlike a number of other features of personality (reduced self reliance, disliking company, unhappiness, excitability, childishness, unreasonableness, unchangeability) which are much more specific in the group of patients who were judged to be showing personality change.

The mechanism underlying changes in the patient is not easy to identify. A number of the changes (irritability, changeability, etc), suggest difficulties in impulse and behaviour control, whereas others (lifeless, listless) suggest an increasing spontaneity of behaviour. In addition, immaturity is an important feature in personality change, as is reduced reasonableness, and being “down to earth”. This is a very heterogenous group of changes, and it is very likely that the mechanisms underlying the different types of change vary from patient to patient as a function of precise pattern of brain damage, the pre-traumatic personality characteristics, and the nature of the social situation in which patient and relative find themselves following injury. It is tempting to speculate about the relationship between patterns of brain damage (for example, frontal damage), and personality change (for example, disinhibition), but localising data were not available at the time when this analysis was carried out. Despite this, it is important to be aware that any focal or lateral effects in this population are found in the context of diffuse damage throughout the brain, and using duration of post traumatic amnesia as an estimate of diffuse damage, there was only a very weak and ambiguous relationship between PTA and the extent of personality changes as assessed by the adjectives. However, as duration of PTA increased, the relative of the patient was much more likely to judge personality change as being present. Increasing severity of diffuse injury therefore predicted an increasing likelihood of the presence of personality change, but did not appear to predict its extent.

The analysis of personality change and family burden showed that at each time of assessment, some 20% to 30% of relatives fell in the “High Burden” category, yet at 3 months, only one adjective was significantly different in the “High Burden” group (Self Reliant—Relies On Others). This effect then disappeared at 6 and 12 months, no doubt as the patient became more independent, at least physically, and reliance was no longer an issue. However, by 6 months, the number of significant differences in the High Burden relatives group had risen to eight, and by 12 months the figure was 12—including the eight found at 6 months. By 12 months

therefore a wide variety of features in the patient had become associated with High Burden in the relative, including control of emotion (quick temper, irritable, changeable), reduction in energy (lifeless, listless), immaturity, emotional coldness, unhappiness, cruelty, meanness, and unreasonableness. The reason for the large increase in significant effects between the 3 and 6 months assessments is not certain. It may be that the relatives only slowly become aware of the full extent of the changes in the patient (hence the later increase in association between personality change in the patient, and burden in the relative). However, even by 3 months, a substantial number of adjectives were showing significant differences between the retrospective and current ratings in relatives whose patient had shown personality change. Presence *per se* of a change is not a guarantee of increased burden in the relative. What is possible is that the ability of the family to tolerate negative changes may reduce. A further possibility is that the relatives may increase the extent to which they judge a particular feature of personality to be present. This possibility was examined by carrying out a series of one way repeated measures analyses of variance, comparing the "current" score at each time for each of the adjectives in the total patient group. There were only three significant F ratios (quick-tempered— $p = 0.02$; dislikes company— $p = 0.01$; and childish— $p = 0.01$), so the increasing extent to which High Burden in the relative is associated with high negative scores on the personality adjectives in the patient is not explained adequately simply by postulating that over time the relative reports increasing degrees of negative personality features in the patient. It seems much more likely therefore that the relative's toleration of personality change drops over time, and this leads to the increasing association between personality change and burden.

The simple presence of personality change (using a Yes/No judgement by the relative) was shown to be associated with family burden but not in a straightforward way. Given that the patient is judged to show personality change, the relative may or may not report high burden. However, given that the family does report high burden, then as time progresses, the likelihood that the patient will be judged to have shown personality change becomes increasingly great, with 11 of the 12 "High Burden" families at 12 months having a patient judged to be showing personality change. Of the 40 "Low-Medium burden" families, 20 had a patient with, and 20 had a patient without personality change. Personality change alone is not therefore sufficient to cause high subjective burden; other factors including personal resources and qualities of the

relative are obviously important in the genesis of burden. However, given that the relative does perceive a high burden, then the chances that the patient is judged to show personality change are very high (92%), whereas if the relative is in the "Low-Medium" burden category, the chance of judged personality change is reduced to 50%.

These results have implications for the rehabilitation of this group of severely injured patients and their families. Some of the changes in personality reported by relatives were very marked indeed, and were certainly enough to cause distress in the relative and in the family in general. Indeed, other evidence from our laboratory³ has shown that the relationship between subjective burden in the family, and general emotional and behavioural changes in the patient is very strong, whereas the relationship between burden and physical change in the patient is weak. It is arguable, therefore, that after the first 6 months of injury during which physical recovery is at its maximum, one of the main thrusts of rehabilitation effort should be directed towards the family at least as much as towards the patient. Attempts should be made to classify, to understand, to predict, and importantly, to modify the changes in personality and behaviour in the patient which may have such an impact upon the family. Teaching the family members to recognise, and to manage personality and behaviour change in the patient may be a crucial aspect of rehabilitation for this group of patients.

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